

REMARKS

I. Introduction

In response to the pending Office Action, Applicants have incorporated the limitations of claim 2 into claim 22 to further clarify the intended subject matter of the invention. No new matter has been added.

Applicants note with appreciation the indication of allowable subject matter recited in claims 2-4, 6, 8-21 and 23-25. As claim 2 has been incorporated into claim 22, Applicants submit that claim 22, and all pending dependent claims thereon (claims 23-25), are allowable over the cited prior art.

For the reasons set forth below, Applicants respectfully submit that all pending claims are patentable over the cited prior art.

II. Rejection Of Claims 1, 5 And 7 Under 35 U.S.C. § 102

Claims 1, 5 and 7 were rejected under 35 U.S.C. § 102(b) as being anticipated by Kiyomoto et al. (US 2002/0085390) and by Hiromoto (JP 2001-060724). Applicants respectfully submit that Kiyomoto and Hiromoto fail to anticipate or render obvious the pending claims for at least the following reasons.

With regard to the present invention, claim 1 recites a light-emitting diode comprising: at least one semiconductor light-emitting device mounted over the surface of a lead frame; and a transparent resin package covering the semiconductor light-emitting device, wherein the resin package includes a base portion covering a base part of the lead frame, an expansion portion provided at a side of the base portion toward a principal-light-emitting surface of the semiconductor light-emitting device and having a side face which is a first curved face capable

of causing total reflection of light emitted from the semiconductor light-emitting device and making the reflected light released toward the front, and a contraction portion located between the expansion portion and the base portion and has a lateral cross section smaller than a maximum lateral cross section of the base portion.

One feature of claim 1 is that the resin package covers the semiconductor light emitting device and a part of the resin package serves as a reflective portion. This simplifies the step of forming a reflective face which allows for a smaller and thinner light-emitting diode. In addition, a base portion is provided to enhance the stability of the diode. Another feature of claim 1 is that the contraction portion is located between the expansion portion and the base portion.

In contrast to the present invention, Hiromoto fails to disclose a base portion, a contraction portion and an expansion portion. Hiromoto teaches a diffused light emitting element having a light emitting element covered by a lump house 3. A hollow part of the lump house is filled with a packing agent 4 which contains a thermosetting transparent resin and a diffusing agent. The packing agent serves to diffuse the light. Although the Examiner states that the Hiromoto discloses a resin portion having a base portion 4a, reference numeral 4a refers to a transparent resin in the packing agent 4, not to a base portion. Furthermore, the light-emitting device is not covered with a resin package, rather the reflecting surface comprises the lump house. Thus, at a minimum, Hiromoto fails to disclose the expansion portion of the present invention.

Accordingly, as Hiromoto fails to disclose a base portion and an expansion portion, Hiromoto also fails to disclose or suggest the limitation “between the expansion portion and the

base portion". As such, Hiromoto also fails to disclose that the contraction portion is located between the expansion portion and the base portion.

It was alleged that Kiyomoto teaches a base portion 382, expansion portion 320, and that the contraction portion is located between the two (Fig. 75 of Kiyomoto). However, in Kiyomoto, reference numeral 320 refers to a light-transparent resin which provides a light reflecting member 321 therein (see, paragraph [0367] of Kiyomoto). Thus, the transparent region 320 is not an expansion portion.

Furthermore, Kiyomoto discloses that all light reflecting members are made of metal. This is in contrast to the present invention in which the reflective portions (expansion portions) are comprised of resin. As such, Kiyomoto fails to disclose an expansion portion. Therefore, again, as Kiyomoto fails to disclose an expansion portion, Kiyomoto fails to disclose a contraction portion located between the expansion portion and the base portion. Accordingly, Kiyomoto fails to teach or suggest claim 1 of the present invention.

Anticipation under 35 U.S.C. § 102 requires that each and every element of the claim be disclosed, either expressly or inherently in a prior art reference, *Akzo N.V. v. U.S. Int'l Trade Commission*, 808 F.2d 1471 (Fed. Cir. 1986). Kiyomoto and Hiromoto do not disclose a light-emitting diode comprising: at least one semiconductor light-emitting device mounted over the surface of a lead frame; and a transparent resin package covering the semiconductor light-emitting device, wherein the resin package includes a base portion covering a base part of the lead frame, an expansion portion provided at a side of the base portion toward a principal-light-emitting surface of the semiconductor light-emitting device and having a side face which is a first curved face capable of causing total reflection of light emitted from the semiconductor light-emitting device and making the reflected light released toward the front, and a contraction

portion located between the expansion portion and the base portion and has a lateral cross section smaller than a maximum lateral cross section of the base portion. Therefore, as it is apparent from the foregoing that Kiyomoto and Hiromoto fail to anticipate or render obvious claim 1 of the present invention, Applicants respectfully request that the § 102 rejections of claim 1 be traversed.

III. All Dependent Claims Are Allowable Because The Independent Claim From Which They Depend Is Allowable

Under Federal Circuit guidelines, a dependent claim is nonobvious if the independent claim upon which it depends is allowable because all the limitations of the independent claim are contained in the dependent claims, *Hartness International Inc. v. Simplimatic Engineering Co.*, 819 F.2d at 1100, 1108 (Fed. Cir. 1987). Accordingly, as claim 1 is patentable for the reasons set forth above, it is respectfully submitted that all pending dependent claims are also in condition for allowance.

IV. Conclusion

Having fully responded to all matters raised in the Office Action, Applicants submit that all claims are in condition for allowance, an indication of which is respectfully solicited.

Application No.: 10/532,813

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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